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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

WALTER, CRAIG E

ART UNIT PAPER NUMBER

2188

DATE MAILED: 03/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/749,756

Applicant(s)

GROVER ET AL.

Examiner

Craig E. Walter

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 July 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Drawings

1. The drawings were received on 30 December 2003. These drawings are deemed acceptable for examination.

Specification

2. The abstract of the disclosure is objected to because of the following reasons:

The abstract is not descriptive of the present invention. It is of the Examiner's opinion that Applicant inadvertently included the abstract from co-pending application 10/750,040, rather than the one for the instant application. Paragraph 0010 from the specification could possibly serve as an appropriate substitute for the present abstract.

Additionally, all extraneous marks should be removed from the abstract (i.e. "Attorney Docket 42.P181169").

Correction is required. See MPEP § 608.01(b).

3. The disclosure is objected to because of the following informalities:

The application numbers for each of the three co-pending applications should be added to paragraph 0001 of the specification. The three co-pending application numbers are 10/750,040; 10/749,815; and 10/750,037 respectively.

Appropriate correction is required.

Claim Objections

4. Claims 2-3, 7,9-10, 14-16 and 21 are objected to because of the following informalities:

As for claims 2-3, 9-10, and 15-16, the phrases "HD reads have been" and "NVC would be available" should be changed to "HD reads that have been" and "NVC that would be available" respectively.

As for claims 7, 14 and 21, the phrase "spinning down the HD and spinning up the HD" should be changed to "spinning down the HD or spinning up the HD". It is not possible to spin down a HD and spin up a HD, as these two events are mutually exclusive.

Claims 4, 11 and 18 are objected to for further limiting a previously objected to claim.

Appropriate correction is required.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

5. Claims 8-14 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. More specifically, the machine readable medium as recited in these claims is directed to a combination of statutory subject matter (i.e. ASIC's and EEPROM's), and non-statutory subject matter (such as carrier waves and signals). See paragraph 0027 (all lines) of the specification.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1-21 are rejected under 35 U.S.C. 102(e) as being anticipated by Coulson (US PG Publication 2003/0074524 A1).

As for claims 1, 8 and 15, Coulson teaches a method (medium and system) comprising:

a processor (Fig. 1, element 16 – paragraph 0019, all lines);

a non-volatile cache (NVC) coupled to the processor (Fig. 1, element 14), the NVC to serve as a cache for a hard drive (HD) of the system (paragraph 0014, all lines – cache is used in conjunction with the HD to improve performance); and

a machine readable medium having stored thereon a set of instructions which when executed (paragraph 0019, all lines – the controller contains code to execute the processes) cause the system to perform a method comprising of:

detecting an occurrence of a predetermined event within the system (paragraph 0020, all lines – memory request is sent (i.e. a read

request) from the memory controller to determine in the cache can satisfy the request;

in response to the predetermined event, changing a power state of a hard drive (HD) – paragraph 0035, all lines – in the case of a HD, the operations (reading and writing to and from the cache) will begin or end with the drive being spun down (i.e. change of power state). In other words, this allows the drive to be spun down in response to a request being satisfied by the cache;

servicing HD data transactions with the NVC while the HD is spun down (paragraph 0020, all lines) – if the cache can satisfy the request, the controller will use the cache rather than the HD. Subsequently, the controller will wait for another request. This process will repeat until the cache cannot satisfy the request, at which time the disk will be accessed (see the flowcharts in Fig.2) – again referring to paragraph 0035, the drive will be spun down if the operation can be satisfied by the cache.

Additional support is provided in paragraph 0033, all lines. Only read misses will cause the disk to be accessed (i.e. spun up – as the drive is to be spun down when not accessed as to conserve power). Memory accesses satisfied will be queued until the disk is needed. Paragraph 0021, all lines further discusses how access to the HD causes a spin up of the disk.

Further support for is provided in claim 32 (including the limitations of claim 30) from Coulson's disclosure - after satisfying the request via the cache, the drive is spun down.

As for claims 2, 9 and 16, Coulson teaches the predetermined event as including detecting a previous predetermined quantity of consecutive HD reads have been satisfied by the NVC (the predetermined quantity of consecutive reads will always be equal to the number of reads satisfied by the cache until a read operations cannot be satisfied by the cache, hence requiring disk access – paragraph 0033, all lines). Again once the drive is spun down, the cache will continue to service requests until the controller determines otherwise.

For clarification, as presently recited, these claims are interrupted as:
the predetermined event includes detecting one of “consecutive HD reads that have been satisfied by the NVC for at least a previous predetermined period of time”, and “a previous predetermined quantity of consecutive HD reads have been satisfied by the NVC”. In other words, the event includes detecting either “consecutive HD reads ...” OR “a previous predetermined quantity ...”.

Even if a narrower interpretation of the claim is assumed (which it is not), Coulson still continues to teach both events.

the predetermined event includes detecting consecutive HD reads that have been satisfied by the NVC for at least a previous predetermined period of time (the predetermined period of time is equal to the time it takes for the controller to determine that a read request goes unsatisfied – Again once the

drive is spun down, the cache will continue to service requests until the controller determines otherwise).

As for claims 3, 10 and 17, Coulson teaches the predetermined event as further including determining a predetermined quantity of the NVC would be available to service HD writes when the HD is spun down (since the entire NVC of Coulson's system is available for caching HD read/write operations, the predetermined quantity is the size of the NVC itself).

As for claims 4, 11 and 18, Coulson teaches changing the power state of the HD as including spinning down the HD - paragraph 0035, all lines – in the case of a HD, the operations (reading and writing to and from the cache) will begin or end with the drive being spun down (i.e. change of power state).

As for claim 5, 12 and 19, Coulson teaches the predetermined event as including detecting a predetermined number of HD data transactions serviced by the NVC or the HD (once the memory controller determines the cache can satisfy the read request, it uses the cache rather than the HD to system conserve power – paragraph 0020, all lines) – The HD can now be spun down to conserve power (paragraph 0035, all lines) – In this case the predetermined number can equal one read request.

As for claims 6, 13 and 20 Coulson teaches the predetermined event further as including detecting a predetermined number of HD data transactions serviced by the NVC or the HD within a previous predetermined period of time (the number of HD transactions are predetermined as they equal the number of requests satisfied by the cache until a read operations cannot be satisfied by the cache, hence requiring disk

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access – paragraph 0033, all lines). The predetermined period of time is equal to the time it takes until an unsatisfied read request is transmitted from the controller.

As for claims 7, 14 and 21 the changing the power state includes spinning up the HD (a read request not satisfied by the cache causes a disk access request, hence causing the drive to spin up – paragraph 0020 and 0021, all lines).

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

7. Claims 1-21 are rejected under 35 U.S.C. 102(a) as being anticipated by Coulson for the same reasons as stated above in section the outlining the rejections set forth under 35 U.S.C. 102(e).

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Ryu (US Patent 5,898,880) teaches a power saving apparatus for hard disk drive and method of controlling the same.

Olsen et al. (US PG Publication 2003/0071561 A1) teaches an apparatus for reducing accesses to level of a storage hierarchy in a computing system.

Chefalas et al. (US PG Publication 2005/0125607 A1) teaches an intelligent caching of working directories in auxiliary storage.

Jennings, III (US Patent 6,134,631) teaches a non-volatile memory with embedded programmable controller.

Ehrlich (US PG Publication 2005/0125600 A1) teaches a method for storing HDD critical data in flash.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Craig E. Walter whose telephone number is (571) 272-8154. The examiner can normally be reached on 8:30a - 5:00p M-F.


10. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mano Padmanabhan can be reached on (571) 272-4210. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

11. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Craig E Walter
Examiner
Art Unit 2188

CEW



MANO PADMANABHAN
SUPERVISORY PATENT EXAMINER